

Intrinsic Safety Box Serial isolator and power supply for Corus

Installation

Commissioning

Safety instructions

1. Introduction

ISB+ is an ATEX isolation unit for the serial ports RS232/RS485 for devices installed in hazardous area. The typical device for this application in Actaris portfolio are: CORUS, SEVC-D, ANGus, EPU50, SL110. It can also provide external power supply for device in hazardous area. The RS232 can be converted to RS485 (half duplex) through the ISB and vice-versa. The ISB+ replaces the previous ISB.

The enclosure of the ISB+ is suitable for DIN Rail mounting and provides an IP20 protection rate. ISB+ can be powered by any commercial external power module within 9-24V range (8W).

2. Technical characteristics

- Power Input : 9-24V DC with 8W min
- Power Output : 8V DC / 100mA for **material with compatible electrical parameters according ATEX certificate**
- Input fuse AC : 800mA T 4000A
- Output fuse DC : 250mA T
- Ambient temperature : from -20 °C to +55 °C
- Protection rate : IP 20 enclosure
- Serial ports for links to hazardous area: RS232 or RS485 (2 wires half duplex), speed 1200-38400bauds, power supply for the serial port of the material in hazardous area
- Serial ports for links to safe area: RS232 or RS485 (2 wires half duplex), speed 1200-38400bauds
- Conversion from RS232 to RS485 possible from each side (hazardous and safe area) with automatic turn-around (same speed).

3. Description

ISB+ can be used to isolate the RS232 and RS485 ports of devices located in hazardous area and to transmit data to the safe area to device without approval for intrinsic safety through an RS232 or an RS485 port.

Only one of the ports (RS232 or RS485) can be used on each side, meaning that only the RS232 **or** the RS485 port can be connected on the ISB+ on hazardous area side and the same for safe area side. It's possible to transform signals from RS232 to RS485 and vice-versa. The RS485 port (on each side) is a two wires port with automatic turn-around management.

On hazardous area side it's possible to connect several devices on the RS485 port at the same time, but only if the compatibility of electrical parameters remain within the range specified in the ATEX approval of the ISB+. The linear C and L of the cable must be integrated in the calculation for the ATEX compatibility.

The power supply output of the ISB+ can be used for any material (only one device can be powered from the output of the ISB+) in hazardous area only if its electrical and functional parameters are compatible with the parameters on the ATEX certificate of the ISB+.

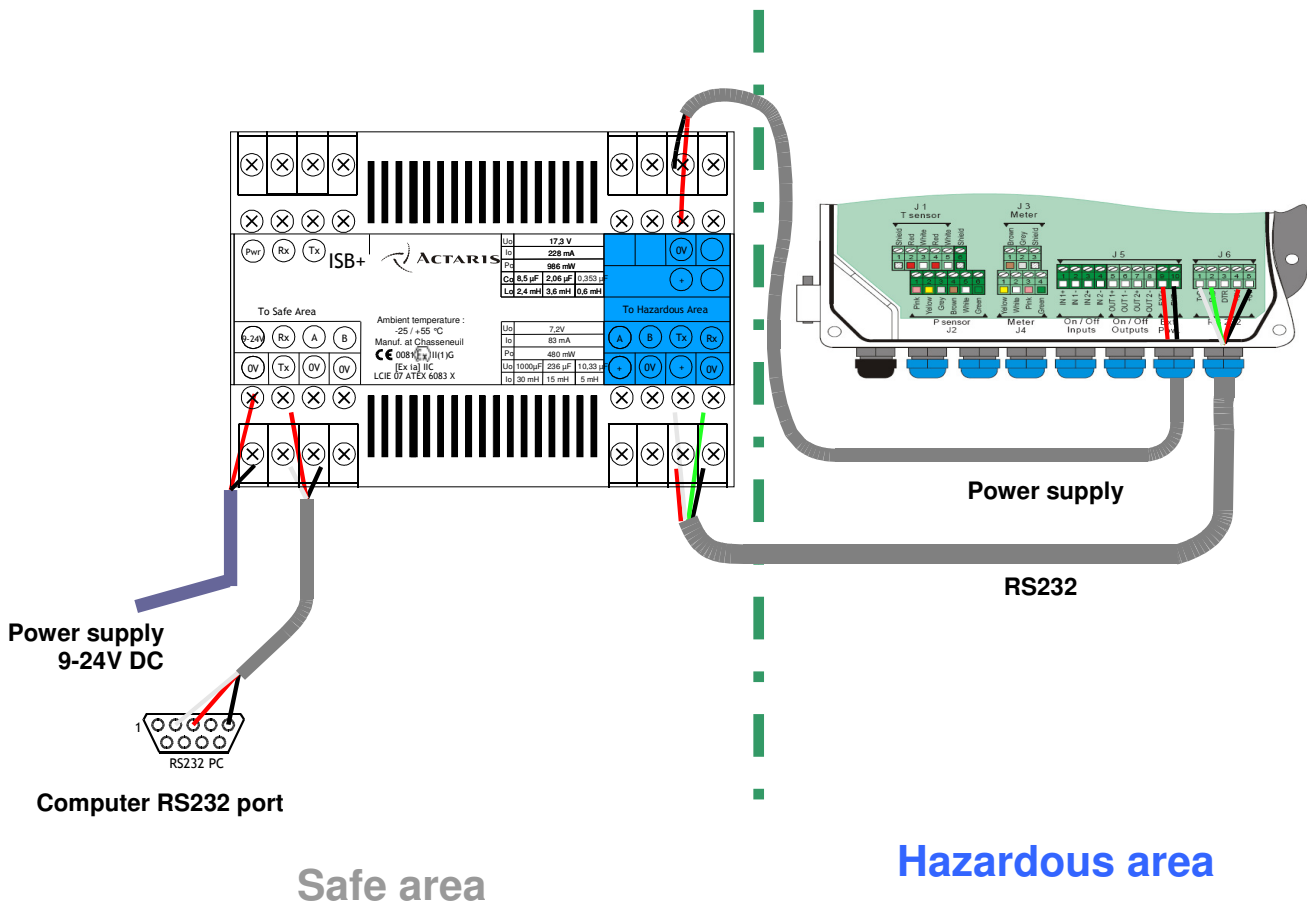
A green LED indicates the presence of voltage on the power input of the ISB+ and two red LEDs are indicate the activity on Rx and Tx signals of the communication ports.

The enclosure of the ISB+ can be mounted on DIN rail and must be protected from water projections.

4. General system overview and connections

The typical application of the ISB+ is for connecting the Corus RS232 port to material in safe area (computer, RTU, etc..).

Typical configuration with a Corus (power supply and RS232 connection) in hazardous area



Electrical connections ISB+/Corus

RS232 link

Corus J6 connector		ISB+ Hazardous area bottom connector
Pin number	Signal	Signal
1	TxD	Tx
2	RxD	Rx
3	DTR	
4	Supply +	+
5	GND	0V

RS485 link

Corus optional RS485 board port A (J1-J2) or B (J3-J4)		ISB+ Hazardous area bottom connector
Pin number	Signal	Signal
1	A	A
2	B	B
4	0 V	0 V (under B signal connector)
5	+	+

External power for Corus (**only for Corus**)

Corus J5 connector		ISB+ Hazardous area top connector
Pin number	Signal	Signal
10	GND	0V
9	Supply +	+

Electrical connections ISB+/SEVC-D

RS232 link

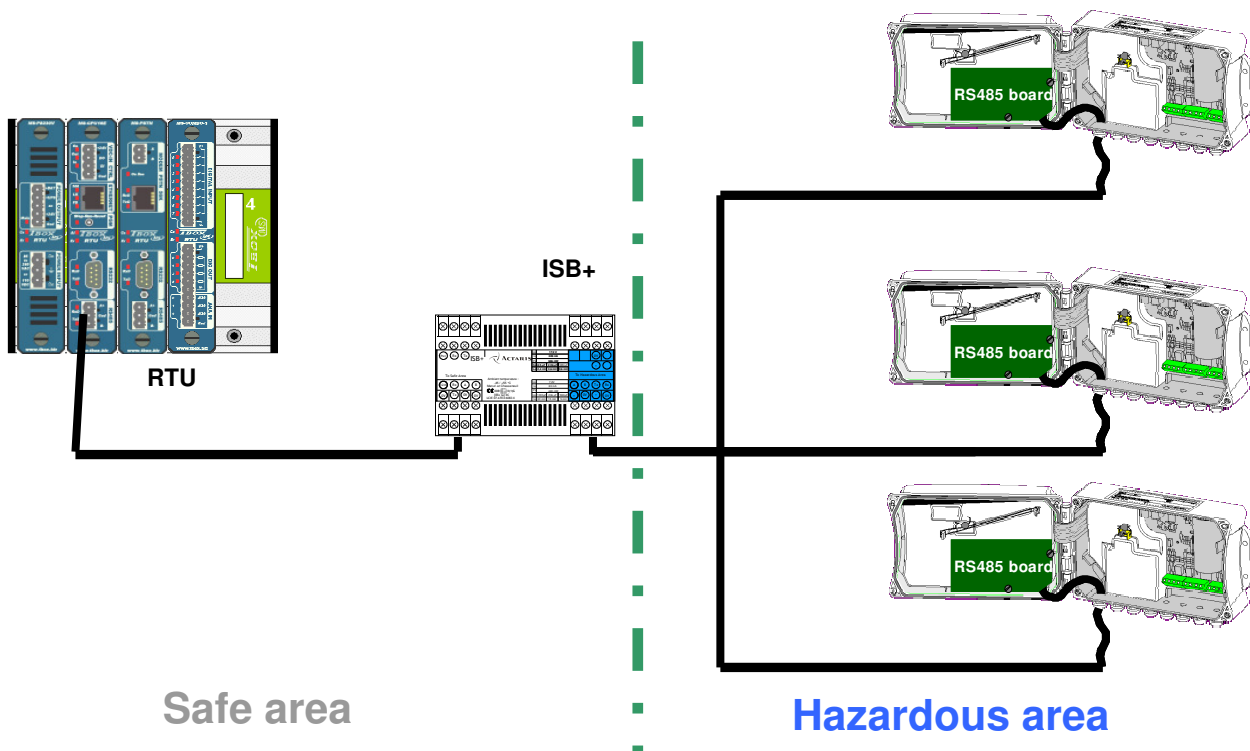
SEVC-D Binder connector		ISB+ Hazardous area bottom connector	Cable color
Pin number	Signal	Signal	
1	Tx	Rx	Brown
2	GND	0V (under Rx signal connector)	Black
3	Rx	Tx	Yellow
4			
5	Supply +	+	Blue
6			

Electrical connections ISB+/ANGus

RS485 link

ANGus RS485 ports port A (J14) or B (J15)		ISB+ Hazardous area bottom connector
Pin number	Signal	Signal
3	Shield	0 V (under B signal connector)
4	A+	A
5	B-	B

Typical configuration with several devices connected on the RS485 port in hazardous area



Electrical connections ISB+/computer or RTU (DB9 connector)

PC or RTU DB9 connector		ISB+ Safe area bottom connector
Pin number	Signal	Signal
2	Rx	Rx
3	Tx	Tx
5	GND	0V

Electrical connections ISB+/external power supply module

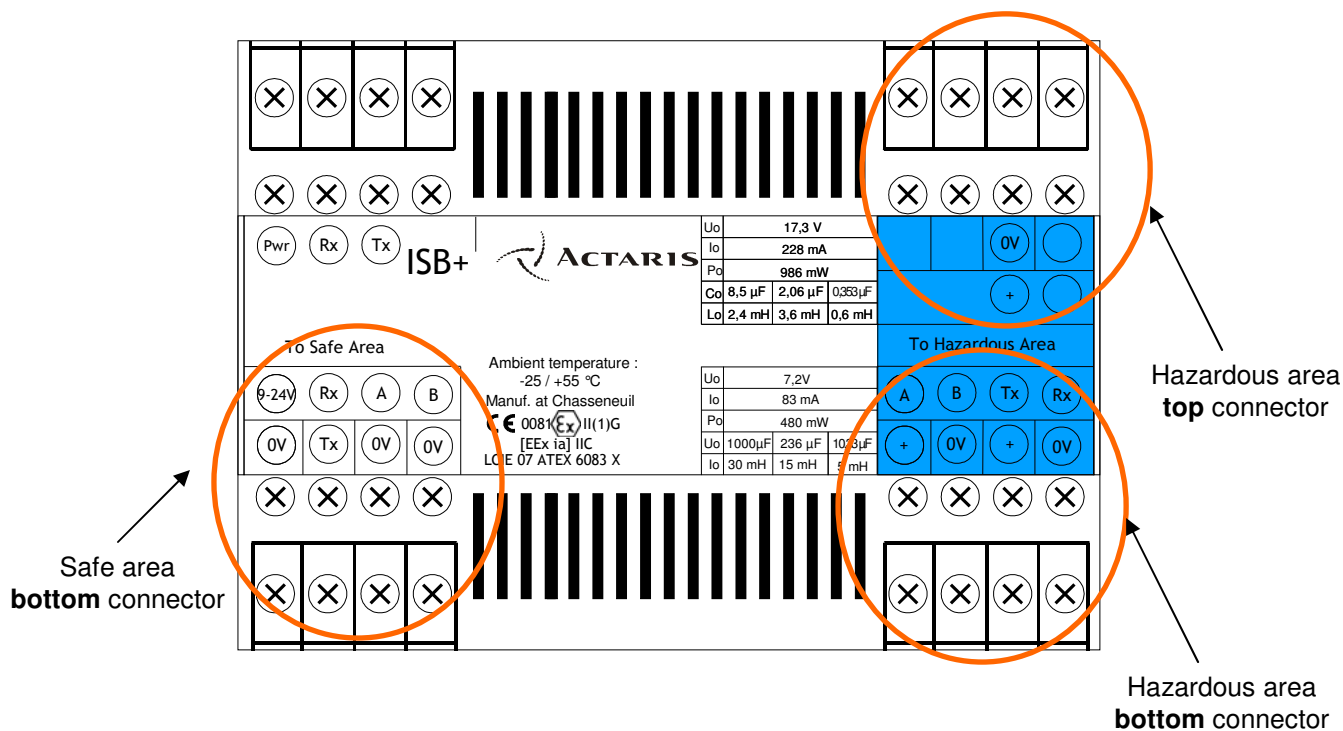
External power supply module TCL24-112 TRACO POWER DC Connector	ISB+ Safe area bottom connector
Signal	Signal
+	9-24V
-	0V

5. Commissioning

Inputs/Output cabling

The cabling of the ISB+ is indicated on its enclosure.

Cables must be mechanically fixed so that there is no risks of short circuit between cables going to safe area and cables going to hazardous area. A minimal distance of 50mm must be respected between those cables.



Installation

The ISB+ must be installed in safe area into a cabinet, providing sufficient protection from climatic conditions, including water and dust (IP65 minimal rate) presence. The cabinet should also protect the ISB+ from direct sunlight.

For a correct mounting the ISB+ must be mounted on a DIN Rail.

ISB+ powering

The ISB+ accepts any commercial power supply providing 9 to 24V DC regulated voltage with a minimal power of 8W. The suggested module by Actaris is the TRACO POWER TCL24-112 which can also be mounted on a DIN Rail next to the ISB+.

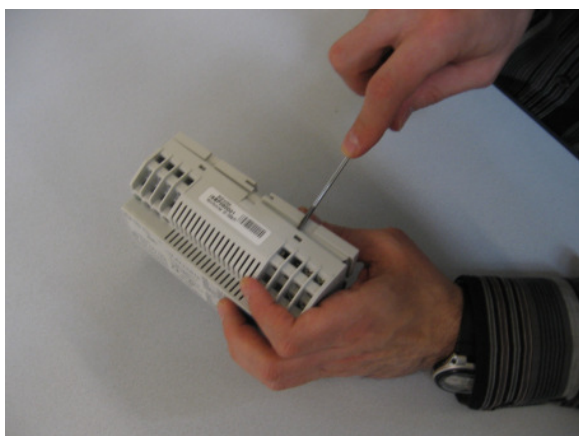
The powering input of the ISB+ can be also connected to a rechargeable battery back with a solar panel and charger. In this configuration the ISB+ can be proposed as a solar power supply unit for the Corus. For more information about this feature you can contact your local Actaris representative.

ISB+ speed/switch configuration

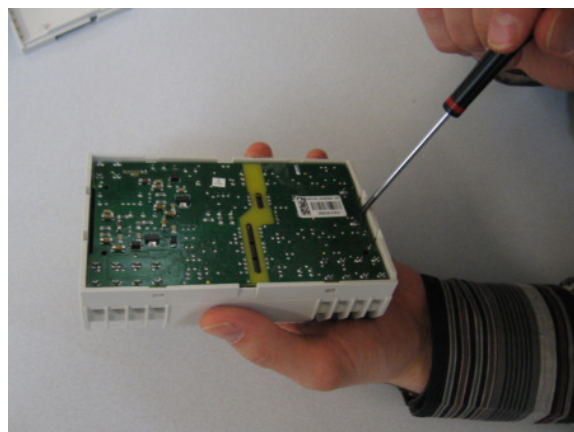
The ISB+ has two internal switches for speed configuration and for RS485 chip. **In usual conditions the position of the switches do not need to be modified.**

To access switches, box must be opened with a flat screwdriver. The user must insert the screw driver under the four connection plots and lever one by one the plots to remove rear part of the box (see picture 1). After removing the rear part, use the screw driver to pull gently the printed board out of the enclosure (as indicated in the picture 2). A flat cable connects the printed board to the 3 LEDs and therefore the printed board can't be completely separated from upper part of the box.

Picture 1

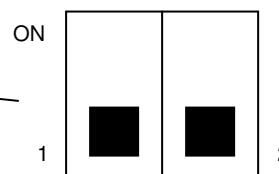
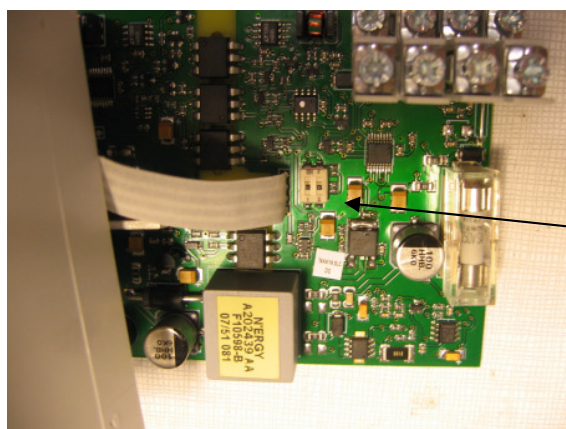


Picture 2



near the flat cable.

The two switches noted 1 and 2 are then accessible



The configuration of the two switches is the following:

Switch 1: Default configuration: Off (Bi-directional RS485 port)

Put to "On" position only for speeds higher than 19200 bauds, but in this case the ISB+ is expecting the first frame to arrive from safe area side (Master/Slave mode).

Switch 2: Default configuration: Off (Communication Speed \geq 9600 bauds)

Put to "On" position only for communication speed \leq 4800 bauds

Appendix 1:

ISB+ : Safety Information

General

The ISB+ Intrinsic safety interface for RS232/RS485 is approved according to 94/9/CE directive (ATEX) relative to introduction of material in explosive atmosphere area.



The respect of this directive is mandatory (from July, 1st 2003) and is now included in the 'CE' marking.

Then, 'CE' marking of the ISB intends now conformity with following directive :

- 94/9/CE (ATEX)
- 89/336/CE (EMC)

Marking relative to ATEX - Zone

The ISB is approved as an associated equipment. Then, it has to be placed in safe area and can be connected directly to an equipment of category 1, with compatible electric characteristics.

The corresponding marking is :  **0081 LCIE 07 ATEX 6083X**  **II(1)G [Ex ia] IIC**

The ambient temperature range for operation is : -25°C ; +55°C

Specific Instructions

- ▶ To avoid erroneous operations, it is recommended to read the whole operating manual before putting the ISB+ into operation.
- ▶ The ISB+ is suitable for use for gas intended into the 'IIC' classification gas (all natural gas , ethylene,...).
- ▶ The connection of the ISB+ to any other instrument or device must be done in accordance to the electrical parameter indicated in the ATEX certificate.
- ▶ The linear L and linear C of the cables used to make the connections between the ISB and the material in hazardous area must be included in the calculation of the electrical parameter's compatibility, according ATEX rules.
- ▶ The ISB+ must be placed into an cabinet with minimal IP65 protection rate to prevent that climatic conditions affect the isolation between safe area and hazardous area connections of the ISB and to avoid water intrusion inside the ISB+.
- ▶ It has to be noted that the directive 1999/92/CEE ("Installation / Users") has also to be respected for the commissioning of the device.
- ▶ When ISB+ is used in the external power supply mode, the supply can be provided through any standard module as this connection is performed in safe area ;
- ▶ It's strictly forbidden to change the internal fuse of the ISB+ with an other type of fuse.
- ▶ To prevent any damage, following operations are recommended to limit electrostatic discharges on the enclosure of the ISB+ :
 - the person carrying out the installation can discharge himself/herself by touching the potential equalisation line

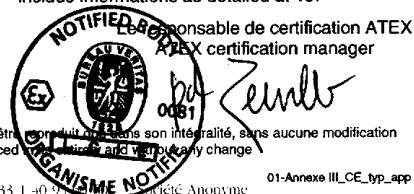
Appendix 2 :

ATEX approval certificate



L C I E

- | | |
|---|--|
| <p>1 ATTESTATION D'EXAMEN CE DE TYPE</p> <p>2 Appareil ou système de protection destiné à être utilisé en atmosphères explosibles (Directive 94/9/CE)</p> <p>3 Numéro de l'attestation d'examen CE de type
LCIE 07 ATEX 6083 X</p> <p>4 Appareil ou système de protection :
Barrière de sécurité intrinsèque
Type : ISB+</p> <p>5 Demandeur : ACTARIS
Adresse : 1 Avenue des temps Modernes
Zi les Bernais
86361 CHASSENEUIL du POITOU</p> <p>6 Fabricant : ACTARIS
Adresse : 1 Avenue des temps Modernes
Zi les Bernais
86361 CHASSENEUIL du POITOU</p> <p>7 Cet appareil ou système de protection et ses variantes éventuelles acceptées sont décrits dans l'annexe de la présente attestation et dans les documents descriptifs cités en référence.</p> <p>8 Le LCIE, organisme notifié sous la référence 0081 conformément à l'article 9 de la directive 94/9/CE du Parlement européen et du Conseil du 23 mars 1994, certifie que cet appareil ou système de protection est conforme aux exigences essentielles de sécurité et de santé pour la conception et la construction d'appareils et de systèmes de protection destinés à être utilisés en atmosphères explosibles, données dans l'annexe II de la directive. Les résultats des vérifications et essais figurent dans le rapport confidentiel N° 60055746/556311.</p> <p>9 Le respect des exigences essentielles de sécurité et de santé est assuré par la conformité à :
- EN 60079-0 (2004)
- EN 60079-11 (2007)</p> <p>10 Le signe X lorsqu'il est placé à la suite du numéro de l'attestation, indique que cet appareil ou système de protection est soumis aux conditions spéciales pour une utilisation sûre, mentionnées dans l'annexe de la présente attestation.</p> <p>11 Cette attestation d'examen CE de type concerne uniquement la conception et la construction de l'appareil ou du système de protection spécifié, conformément à l'annexe III de la directive 94/9/CE. Des exigences supplémentaires de la directive sont applicables pour la fabrication et la fourniture de l'appareil ou du système de protection. Ces dernières ne sont pas couvertes par la présente attestation.</p> <p>12 Le marquage de l'appareil ou du système de protection doit comporter les informations détaillées au point 15.
Fontenay-aux-Roses, le 30 octobre 2007</p> | <p>1 EC TYPE EXAMINATION CERTIFICATE</p> <p>2 Equipment or protective system intended for use in potentially explosive atmospheres (Directive 94/9/EC)</p> <p>3 EC type examination certificate number
LCIE 07 ATEX 6083 X</p> <p>4 Equipment or protective system :
Intrinsic safety barrier
Type : ISB+</p> <p>5 Applicant : ACTARIS
Address : 1 Avenue des temps Modernes
Zi les Bernais
86361 CHASSENEUIL du POITOU</p> <p>6 Manufacturer : ACTARIS
Address : 1 Avenue des temps Modernes
Zi les Bernais
86361 CHASSENEUIL du POITOU</p> <p>7 This equipment or protective system and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.</p> <p>8 LCIE, notified body number 0081 in accordance with article 9 of the Directive 94/9/EC of the European Parliament and the Council of 23 March 1994, certifies that this equipment or protective system has been found to comply with the essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive. The examination and test results are recorded in confidential report N° 60055746/556311.</p> <p>9 Compliance with the Essential Health and Safety Requirements has been assured by compliance with :
- EN 60079-0 (2004)
- EN 60079-11 (2007)</p> <p>10 If the sign X is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.</p> <p>11 This EC type examination certificate relates only to the design and construction of this specified equipment or protective system in accordance with annex III to the directive 94/9/EC. Further requirements of the directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this certificate.</p> <p>12 The marking of the equipment or protective system shall include informations as detailed at 15.</p> |
|---|--|



Seul le texte en français peut engager la responsabilité du LCIE. Ce document ne peut être reproduit sans son intégralité, sans aucune modification.
The LCIE's liability applies only on the French text. This document may only be reproduced in its original form and without any change.

LCIE	33, av du Général Leclerc	Tél : +33 1 40 95 86 56	Société Anonyme
Laboratoire Central	BP 8	Fax : +33 1 40 95 86 56	au capital de 15 745 984 €
des Industries Electriques	92266 Fontenay-aux-Roses cedex	contact@lcie.fr	RCS Nanterre B 408 363 174
Une société de Bureau Veritas	France	www.lcie.fr	

01-Annexe III_LCE_typ_app - rev0.DOC Page 1 of 2



LCIE

13 ANNEXE

13 SCHEDULE

14 ATTESTATION D'EXAMEN CE DE TYPE

14 EC TYPE EXAMINATION CERTIFICATE

LCIE 07 ATEX 6083 X

LCIE 07 ATEX 6083 X

15 DESCRIPTION DE L'APPAREIL OU DU SYSTEME DE PROTECTION

15 DESCRIPTION OF EQUIPMENT OR PROTECTIVE SYSTEM

Barrière de sécurité intrinsèque
Type : ISB+

Intrinsic safety barrier
Type : ISB+

L'appareil assure l'isolation galvanique entre des matériels certifiés de sécurité intrinsèque placés en zone atmosphère explosive et des appareils non certifiés placés en zone non dangereuse.

The equipment provides a galvanic insulation between certified intrinsically safe equipments mounted in hazardous area and non certified equipments mounted in safe area.

Paramètres spécifiques du ou des modes de protection concernés :

Specific parameters of the mode(s) of protection concerned :

Bornes / Terminal blocks	Paramètres électriques / Electrical parameters								
	Uo (V)	Io (mA)	Po (mW)	Co (µF)			Lo (mH)		
				IIC	IIB	IIA	IIC	IIB	IIA
+ ,0V	17,3	228	986	0,353	2,06	8,5	0,6	2,4	3,6
+ ,0V,A,B	7,2	83	480	10,33	236	1000	5	15	30
+ ,0V,Rx,Tx	7,2	83	480	10,33	236	1000	5	15	30

Le marquage doit être :

ACTARIS Adresse : ...
Type : ISB+
N° de fabrication : ... Année de fabrication : ...

Ⓔ II (1) G

[Ex ia] IIC

LCIE 07 ATEX 6083 X

Uo ≤ ..., Io ≤ ..., Po ≤ ..., Co ≤ ..., Lo ≤ ... (complété avec les valeurs du tableau ci-dessus)

L'appareil doit également comporter le marquage normalement prévu par les normes de construction qui le concerne.

The marking shall be :

ACTARIS Address : ...
Type : ISB+
Serial number : ... Year of construction : ...

Ⓔ II (1) G

[Ex ia] IIC

LCIE 07 ATEX 6083 X

Uo ≤ ..., Io ≤ ..., Po ≤ ..., Co ≤ ..., Lo ≤ ... (completed with values of table above)

The equipment shall also bear the usual marking required by the manufacturing standards applying to such equipment.

16 DOCUMENTS DESCRIPTIFS

16 DESCRIPTIVE DOCUMENTS

Dossier de certification N° D2007720-AE revA du 10/07.
Ce document comprend 12 rubriques (57 pages).

Certification file N° D2007720-AE revA dated 10/07.
This file includes 12 items (57 pages).

17 CONDITIONS SPECIALES POUR UNE UTILISATION SÛRE

17 SPECIAL CONDITIONS FOR SAFE USE

Les bornes de sécurité intrinsèque ne peuvent être raccordées qu'à des matériels certifiés de sécurité intrinsèque. Ces associations doivent être compatibles vis-à-vis de la sécurité intrinsèque (voir paramètres électriques paragraphe 15).

Température ambiante d'utilisation : - 25°C à + 55°C.

The intrinsic safety terminal blocks can be only connected to certified intrinsic safety equipments. These combinations must be compatible as regard intrinsic safety rules (see electrical parameters clause 15).

Operating ambient temperature : - 25°C to + 55°C.

18 EXIGENCES ESSENTIELLES DE SECURITE ET DE SANTE

18 ESSENTIAL HEALTH AND SAFETY REQUIREMENTS

Couvertes par les normes listées au point 9.

Covered by standards listed at 9.

19 VERIFICATIONS ET ESSAIS INDIVIDUELS

19 ROUTINE VERIFICATIONS AND TESTS

Chaque transformateur T1 doit être soumis à un essai de rigidité diélectrique pendant 1 minute sous une tension sinusoïdale de 50 Hz et d'une valeur de 2500V appliquée entre l'enroulement primaire et l'enroulement secondaire.

Each transformer T1 must be submitted to a dielectric strength test during 1 minute, with a sine-shaped voltage at 50 Hz of 2500 V r.m.s. between the primary winding and the secondary winding.

